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मानक

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 11887 (1986): Specification for Cores for Aircraft Tyre
Tube Valves [TED 14: Aircraft and Space Vehicles]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR CORES FOR AIRCRAFT TYRE TUBE VALVES

1. **Scope** — Covers the dimensional and performance requirements of cores used in aircraft tyre tube valves. Valve caps and stem are covered separately.

2. **Types** — Shall be of two types, namely, long core and short core. A general assembly of both types of cores are shown in Fig. 1 and 2.

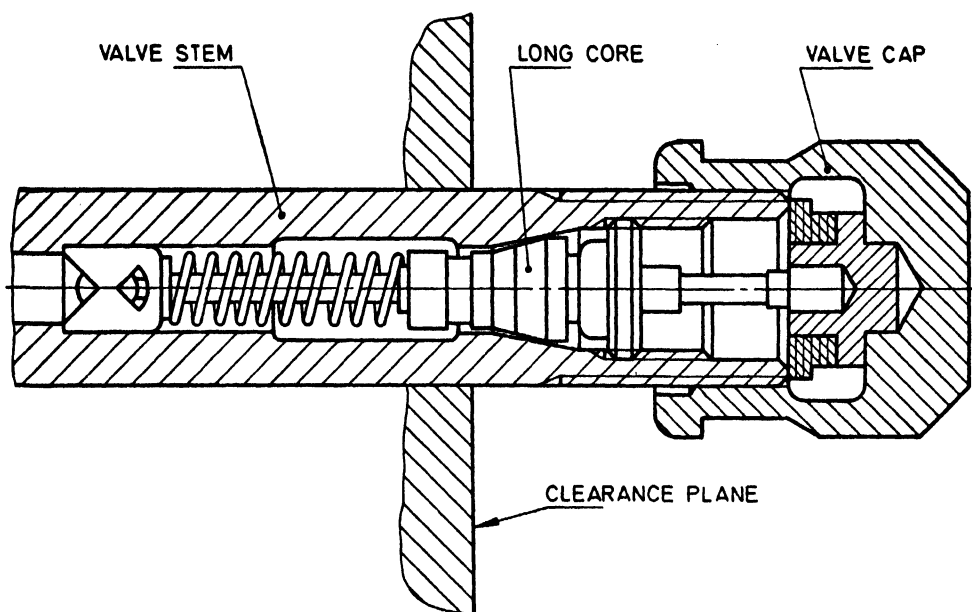


FIG. 1 GENERAL ASSEMBLY — LONG CORE

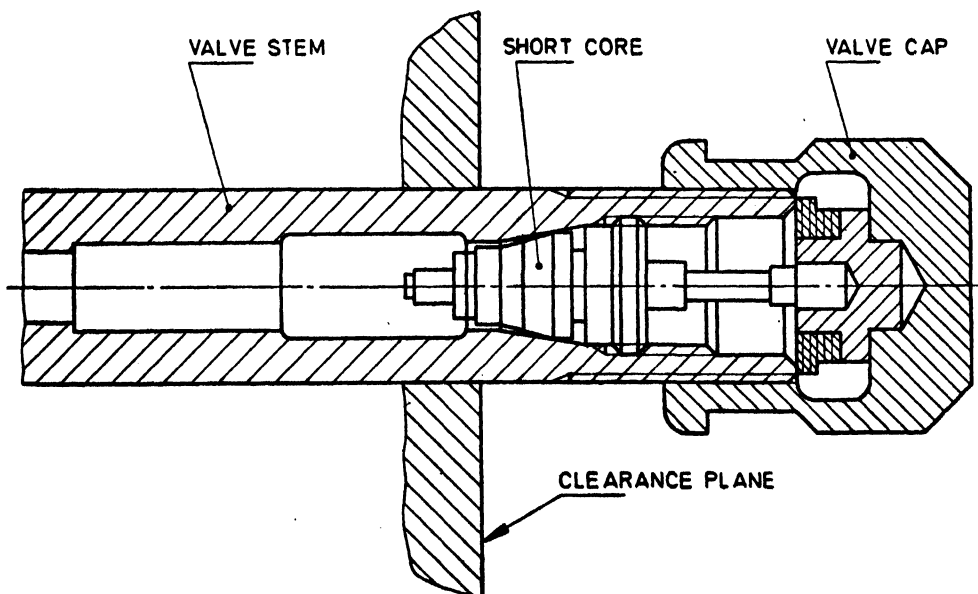


FIG. 2 GENERAL ASSEMBLY — SHORT CORE

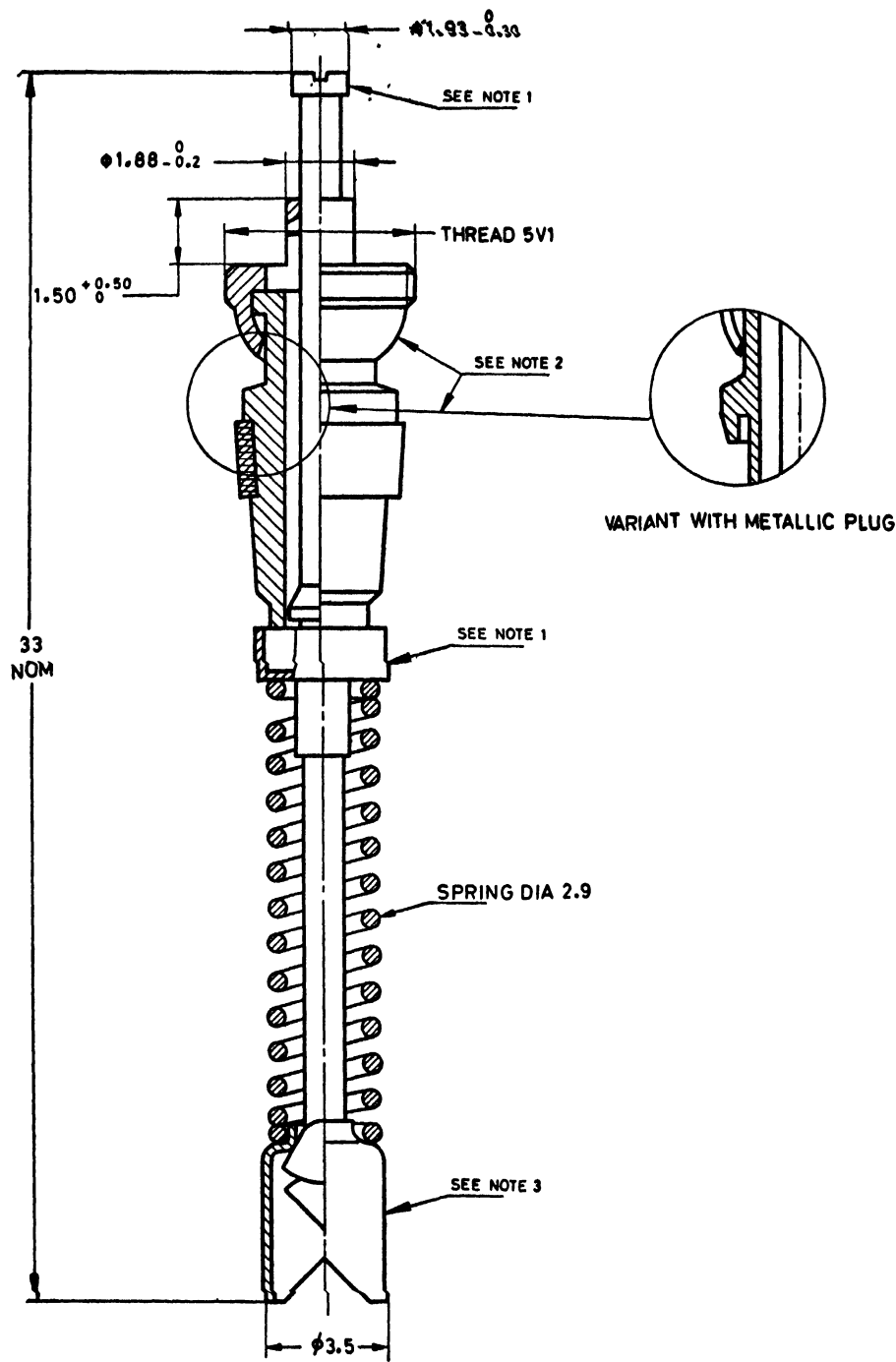
Adopted 18 November 1986

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3. Dimensions — Dimensions of long core shall conform to Fig. 3. Short core with inside spring and outside spring shall be as per Fig. 4 and 5.



Note 1 — Aircraft valve cores shall be identified by a brass or copper-coloured core pin with a groove in the pin head and by a brass or copper-coloured plunger cup.

Note 2 — The swivel shall be rotatable in relation to the barrel.

Note 3 — The spring cup of the long core is optional in configuration. However, it shall fit the core chamber of the aircraft tyre valve as in Fig. 3

All dimensions in millimetres.

FIG. 3 DIMENSIONS FOR LONG CORE

**AMENDMENT NO. 1 MARCH 2002
TO
IS 11887 : 1986 SPECIFICATION FOR CORES FOR
AIRCRAFT TYRE TUBE VALVES**

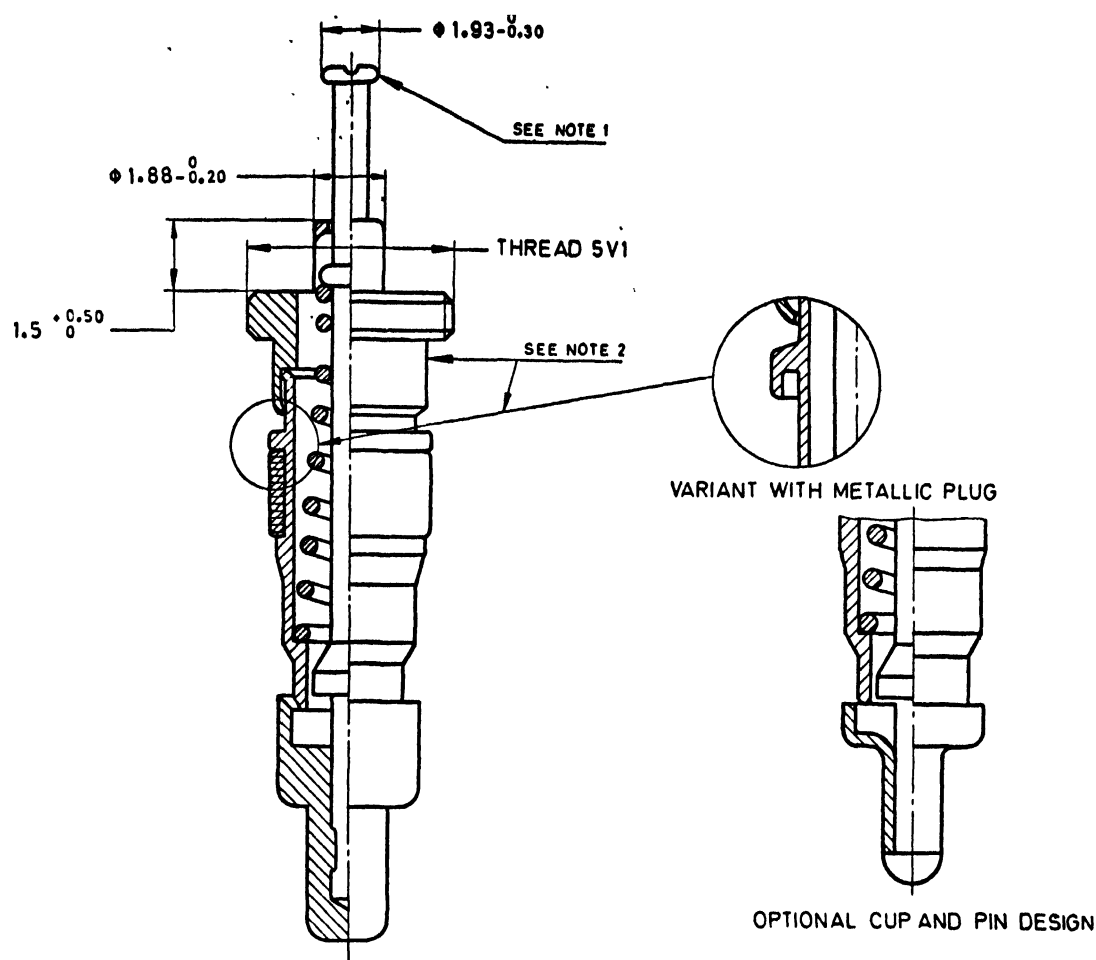
(*Page 6, clause 7.1.8.2*) — Insert the following new clause after 7.1.8.2:

'7.2 Retest

In case of failure in any test parameter, twice the sample size shall be taken and subjected to test for the failed parameter. The batch shall be accepted if all the samples pass the test.'

(TED 14)

Reprography Unit, BIS, New Delhi, India



Note 1 — Aircraft valve cores shall be identified by a brass or copper-coloured core pin with a groove in the pin head and by a brass or copper-coloured plunger cup.

Note 2 — The swivel shall be rotatable in relation to the barrel.

All dimensions in millimetres.

FIG. 4 DIMENSIONS FOR SHORT CORE WITH INSIDE SPRING

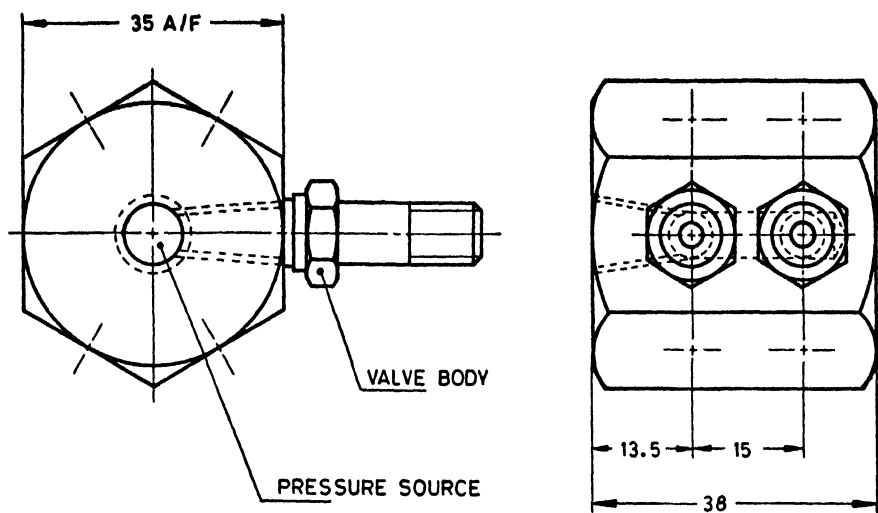
3.1 Threads — The threads shall conform to IS : 9449 (Part 1)-1980 'Dimensions of tyre valve threads: Part 1 Threads 5V1, 5V2, 6 V₁ and 8V₁'.

3.1.1 The gauging practice for the threads shall be in accordance with IS : 2334-1975 'Gauging practice for ISO metric screw threads'.

4. Materials — Shall conform to the following:

Component	Conforming to
Core, core pin	IS : 2704-1983 'Brass wire for cold headed and machined parts (first revision)', or IS : 4170-1967 'Brass rods for general engineering purposes'
Spring wire	IS : 4454 (Part 4)-1975 'Steel wires for cold formed spring: Part 4 Stainless spring steel wire for normal corrosion resistance (first revision)'
Spring cup	IS : 3168-1981 'Brass strip and foil for deep drawing (first revision)' or IS : 410-1977 'Cold rolled brass, sheet strip and foil (third revision)'
Sealing washer (gasket)	Natural rubber or any other compatible material capable of withstanding operating temperatures between -54°C and 177°C

Any other material if used, shall be as per agreement between a purchaser and supplier.



All dimensions in millimetres.
FIG. 6 MANIFOLD TEST ASSEMBLY

7.1.1 Dimensions and workmanship — All valve cores shall be carefully examined with regard to construction, workmanship, dimensions and materials against the requirements stipulated.

7.1.2 Torque — The valves subjected to tightening torque as per 5 shall withstand air pressures from 35 to 3 800 kPa. The cores shall be free of any leakages.

7.1.3 Washout — Cores that have complied with 7.1.2 shall be opened manually and held open for a minimum of 3 seconds allowing internal air pressure to flow out over the lower gasket at a high rate. The cores shall then be closed. A least 10 cycles shall be repeated. The valve cores shall complete the cycles of this test without any leakage.

7.1.4 Blowout — Cores that have complied with 7.1.2 and 7.1.3 shall be subjected to a blowout test.

The manifold test pressure shall be reduced to 0 kPa. Using a standard air chuck with an external live pressure of 3 800 kPa, each valve core shall be opened manually and held open for a minimum of 3 seconds allowing the external air pressure to flow in over the cup gasket at a high rate. After 3 seconds the chuck and pressure shall be removed and the valve core allowed to close.

Each valve core shall complete 10 cycles of this test without leakage.

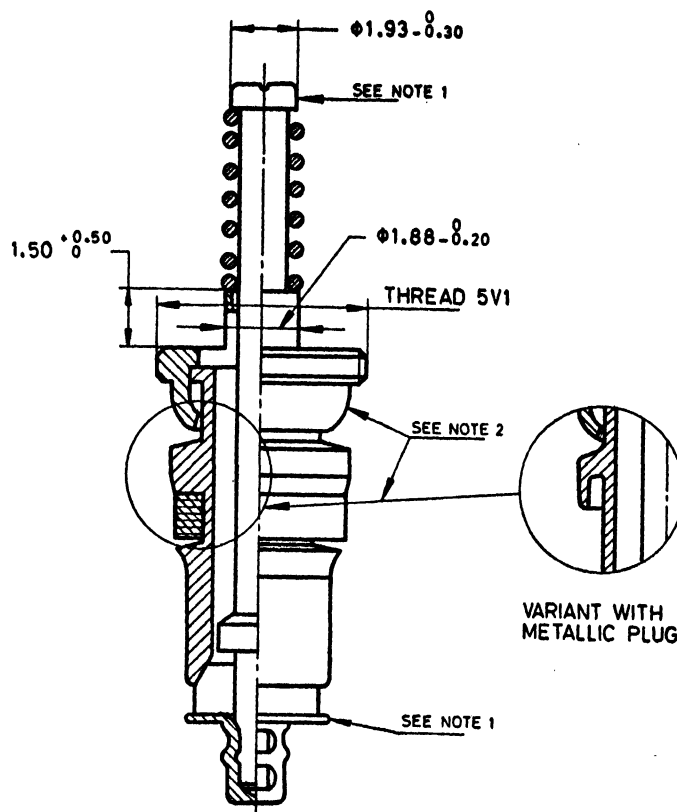
7.1.5 Impulse — Valve cores installed in test manifold shall be subjected to pressure impulse at ambient temperature between the pressures given in Table 1 with air in contact with valve cores.

Operation	TABLE 1 IMPULSE CONDITIONS			Total Cycles
	Pressure (kPa)		Time (Cycles/minute)	
	Min	Max		
High pressure cycling	2 400	3 800	35	1 000
Normal cycling	620	2 400	35	1 000
Low pressure cycling	0	620	35	1 000

7.1.5.1 The pressure shall not be allowed to fall below the limit given in Table 1 at any time during the test. An air-tight rubber or synthetic bladder shall be installed over each valve body in a collapsed condition in such a manner as to collect all the air leakages past each valve core separately. The bladders shall show no inflation during the test and valve caps shall not be used to cover the valves.

7.1.6 High temperature — Valve cores installed in test manifold shall be inserted into an oven and the temperature increased to 93°C. The assembly shall then be allowed to soak at that temperature for 24 hours and then cooled to 52°C or the ambient temperature. The valve cores shall then be checked for leakages in the following sequence:

- a) Leakage at 3 800 kPa;
- b) Re-torque as per 5 any core that has leaked during leakage test at (a) and recheck for leakage;
- c) Washout test as per 7.1.3.



Note 1 — Aircraft valve cores shall be identified by a brass or copper-coloured core pin with a groove in the pin head and by a brass or copper-coloured plunger cup.

Note 2 — The swivel shall be rotatable in relation to the barrel.

All dimensions in millimetres.

FIG. 5 DIMENSIONS FOR SHORT CORE WITH OUTSIDE SPRING

5. General Requirements — The core chamber in the valve stem shall be suitable to accommodate both types of cores. When a torque of 0.17 Nm to 0.34 Nm is applied for a core with elastomeric gaskets the core pin head shall not be more than 0.25 mm above or 0.90 mm below the valve mouth. For a metallic edged barrel gasket the torque shall vary between 0.34 to 0.54 Nm.

6. Workmanship and Finish — The workmanship shall ensure satisfactory operation and service life. The components shall be free of burrs, sharp edges, loose chips or any other foreign matter. The cup of the valve core shall be brass or copper coloured for positive item identification. All other exposed metal surfaces shall be protected by plating conforming to service grade 2 of IS:1068-1968 'Electroplated coatings of nickel and chromium on iron and steel (*first revision*)'. Any other type of plating as agreed to between the purchaser and the supplier may be followed.

7. Tests — Unless otherwise specified all tests shall be conducted at ambient conditions of temperature and pressure with the valve core installed in a manifold similar to that shown in Fig. 6. All leakage tests shall be completed by immersing the test in assembly water, acetone, or alcohol whichever best suits the test condition.

7.1 The test requirements of valve cores for performance qualification and acceptance shall comprise of the following:

- a) Dimensions, workmanship,
- b) Torque,
- c) Washout,
- d) Blowout,
- e) Impulse,
- f) High temperature,
- g) Peak temperature, and
- h) Low temperature.

- d) Reduce the internal pressure to 0 kPa and blowout test to be done in accordance with 7.1.4.
- e) Reduce the internal pressure to 175 kPa and check for leakage. The pressure increased in increments and leakage checked at 620 kPa, 2 400 kPa and 3 800 kPa.

Note 1 — The cup gasket of each valve core shall be unseated and resealed for a minimum of 7 times at each pressure level.

Note 2 — Leakage test shall be accomplished at temperature of -54°C . The acetone or alcohol used in leakage testing shall be cooled to -54°C . The pressurized air used in leakage testing shall be cooled to -54°C .

7.1.7 Peak temperature — Valve cores that have completed satisfactorily the high temperature test as per 7.1.6 shall be inserted into an oven and the temperature increased to 120°C . After the assembly has reached 120°C , it shall be allowed to soak at that temperature for a minimum of 20 minutes and then allowed to cool to 52°C or ambient temperature. After cooling each valve core shall complete without failure, the leakage check in accordance with the checking procedures outlined in the high temperature test as in 7.1.6. Each valve core shall complete 10 cycles of this test without leakage.

7.1.8 Low temperature — Valve cores shall withstand a pressure of 3 800 kPa without failure one cycle as per 7.1.8.1 and 7.1.8.2.

7.1.8.1 A minimum of six valve cores installed in the test manifold shall be inserted into an environment of -54°C and allowed to soak at that temperature for 24 h. At the end of the soak period each valve core shall complete the leakage check procedures as outlined in 7.1.6.

7.1.8.2 A minimum of six valve cores shall be mounted in a test manifold with 0 kPa internal pressure. The test assembly shall then be inserted into an environment of -54°C and allowed to soak at temperature for 24 h. At the end of the soak period each valve core shall complete without failure the leakage check procedures as per 7.1.6.

8. Sampling — For test purposes the sampling plan shall be as followed.

8.1 Sampling Plan A — Six samples shall be selected at random from each lot and subjected to the following tests:

- a) Torque,
- b) Washout,
- c) Blowout, and
- d) Impulse.

8.2 Sampling Plan B — Six additional samples shall be selected at random from each lot and subjected to each of the following tests:

- a) High temperature,
- b) Peak temperature, and
- c) Low temperature.

8.2.1 For ensuring randomness of selection, IS : 4905-1968 'Method for random sampling' shall be followed.

8.3 A lot shall be considered as conforming to the standard if all the samples taken from each lot pass the tests in 8.1 and 8.2.

8.4 Lot — A lot shall consist of all valve cores of the same type manufactured under the same raw material under one continuous production run.

9. Marking — Shall be as agreed to between the purchaser and the supplier.

9.1 Certification Marking — Details available with the Bureau of Indian Standards.

10. Packing — Shall be as per best prevalent trade practice.

EXPLANATORY NOTE

In the preparation of this standard, assistance has been derived from Doc : ISO/TC 31/SC 9-N 158 'Valve core—Performance and qualification' prepared by the technical committee for tyres and tubes of the International Organization for Standardization.

Assistance has also been taken from the following:

ISO 7442-1982 'Tyre valves — ISO Core chamber No. 1'

ISO 7595-1982 'Tyre valve — Aircraft — interchangeability dimensions'

IS : 10966-1984 'Dimensions of valve stem of aircraft tyre tubes.'

BS C 7 — 1967 'Interconnectibility of aircraft tyre valves', (*Aerospace Series*).